

Peterson 18

Serial No. 09/915,963

**Claims Listing**

1           1.       (Canceled)

1           2.       (Canceled)

1           3.       (Currently Amended) An antenna structure comprising:  
2  
3           at least one antenna element, the at least one antenna element having at least one  
4           taper; and  
5  
6           a symmetrical finite ground plane coupled with the at least one antenna element;  
7  
8           wherein the at least one antenna element comprises a traveling wave antenna supporting a  
9           phase velocity greater than the speed of light and~~The antenna structure of Claim 1,~~  
10          wherein the taper comprises a linear profile, a linear constant profile, a broken-linear  
11          profile, an exponential profile, an exponential constant profile, a tangential profile, a step-  
12          constant profile, or a parabolic profile.

1           4.       (Currently Amended) An antenna structure comprising:  
2  
3           at least one antenna element, the at least one antenna element having at least one  
4           taper; and  
5  
6           a symmetrical finite ground plane coupled with the at least one antenna element;  
7

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8 | wherein the at least one antenna element comprises a traveling wave antenna supporting a  
9 | phase velocity greater than the speed of light and the antenna structure of Claim 1,  
10 | **wherein the antenna structure supports a cigar-like directional three-dimensional beam**  
11 | **pattern and a butterfly wing-like directional three-dimensional beam pattern.**

1 |       **5. (Currently Amended) The antenna structure of Claims 3 or 4 Claim 4,**  
2 | **wherein the at least one antenna element is positioned at an angle from the symmetrical**  
3 | **ground plane.**

1 |       **6. (Original) The antenna structure of Claim 5, wherein the angle is about 90**  
2 | **degrees with respect to the x-, y- and z- axes.**

1 |       **7. (Currently Amended) The antenna structure of Claims 3 or 4 Claim 1,**  
2 | **wherein the at least one antenna element is coupled with the symmetrical ground plane by**  
3 | **means of an unbalanced impedance.**

1 |       **8. (Original) The antenna structure of Claim 7, wherein the unbalanced**  
2 | **impedance comprises a coaxial cable.**

1 |       **9. (Original) The antenna structure of Claim 7, wherein a first conductor of**  
2 | **the unbalanced impedance mechanically couples the at least one antenna element with the**  
3 | **symmetrical ground plane.**

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1           **10.**    (Currently Amended) The antenna structure of Claims 3 or 4~~Claim 1~~,  
2    wherein the symmetrical ground plane is disk shaped.

1           **11.**    (Canceled)

1           **12.**    (Canceled)

1           **13.**    (Currently Amended) An antenna structure comprising:  
2  
3       an array of at least two antenna elements, each antenna element having at least  
4       one taper;  
5  
6       a symmetrical finite ground plane; and  
7  
8       an unbalanced impedance for coupling the array of at least two antenna elements  
9       with the symmetrical ground plane;  
10  
11       wherein at least one antenna element of the array comprises a traveling wave antenna  
12       supporting a phase velocity greater than the speed of light and~~The antenna structure of~~  
13       ~~Claim 11~~, wherein the taper of at least one antenna element of the array comprises a  
14       linear profile, a linear constant profile, a broken-linear profile, an exponential profile, an  
15       exponential constant profile, a tangential profile, a step-constant profile, or a parabolic  
16       profile.

1           **14.**    (Currently Amended) An antenna structure comprising:  
2

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3        an array of at least two antenna elements, each antenna element having at least  
4        one taper;  
5  
6        a symmetrical finite ground plane; and  
7  
8        an unbalanced impedance for coupling the array of at least two antenna elements  
9        with the symmetrical ground plane;  
10  
11       wherein at least one antenna element of the array comprises a traveling wave antenna  
12       supporting a phase velocity greater than the speed of light and ~~The antenna structure of~~  
13       ~~Claim 11.~~ wherein each antenna element of the array supports a cigar-like directional  
14       three-dimensional beam pattern and a butterfly wing-like directional three- dimensional  
15       beam pattern.

1        **15.**     (Currently Amended) The antenna structure of Claims 13 or 14 ~~Claim 11,~~  
2        wherein each antenna element of the array is positioned at an angle from the symmetrical  
3        ground plane.

1        **16.**     (Original) The antenna structure of Claim 15, wherein the angle for each  
2        antenna element is about 90 degrees with respect to the x-, y- and z- axes.

1        **17.**     (Currently Amended) The antenna structure of Claims 13 or 14 ~~Claim 11,~~  
2        wherein the unbalanced impedance comprises a coaxial cable.

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1           **18.**     (Original) The antenna structure of Claim 17, wherein a first conductor of  
2     the unbalanced impedance mechanically couples each antenna element of the array with  
3     the symmetrical ground plane.

1           **19.**     (Currently Amended) The antenna structure of Claims 13 or 14~~Claim 14~~,  
2     wherein the symmetrical ground plane is disk shaped.

1           **20.**     (Currently Amended) The antenna structure of Claims 13 or 14~~Claim 11~~,  
2     further comprising a slow wave antenna to widen the directivity of the antenna structure.

1           **21.**     (Canceled)

1           **22.**     (Currently Amended) An apparatus comprising:  
2  
3     a transceiver; and  
4  
5     an antenna structure for radiating or capturing electromagnetic energy from or to  
6     the transceiver comprising:  
7  
8           at least one antenna element having at least one taper, the taper comprising  
9           a linear profile, a linear constant profile, a broken-linear profile, an  
10          exponential profile, an exponential constant profile, a tangential profile, a  
11          step-constant profile, or a parabolic profile;  
12

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13 | a symmetrical disk shaped finite ground plane, the at least one antenna  
14 | element being positioned at an angle from the symmetrical disk shaped  
15 | finite ground plane; and  
16 |  
17 | an unbalanced impedance for coupling the at least one antenna element  
18 | with the symmetrical disk shaped finite ground plane;  
19 |  
20 | wherein the at least one antenna element comprises a traveling wave antenna supporting a  
21 | phase velocity greater than the speed of light and the apparatus of Claim 21, wherein the  
22 | at least one antenna element supports a cigar-like directional three-dimensional beam  
23 | pattern and a butterfly wing-like directional three- dimensional beam pattern.

1 | 23. (Currently Amended) The antenna structure of Claim 2122, wherein the  
2 | angle is about 90 degrees with respect to the x-, y- and z- axes.

1 | 24. (Currently Amended) The antenna structure of Claim 2422, wherein the  
2 | unbalanced impedance comprises a coaxial cable.

1 | 25. (Currently Amended) The antenna structure of Claim 2122, wherein a first  
2 | conductor of the unbalanced impedance mechanically couples the at least one antenna  
3 | element with the symmetrical ground plane.